

## Block view of the study programme

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### Block 1

Depending on your track record or your professional/research focus, some prerequisites/corequisites of your first year program might appear in bloc 2. You are therefore invited to go through the list of courses suggested in bloc 2 even if you enroll for the first time in this master program.

To complete their curriculum, students must earn or validate the 60 credits of the compulsory courses (including the master thesis), 30 credits "Technical formation" and 30 credits from the professional focus.

Ideally, students enrolling in the master program should have acquired the skills and knowledge corresponding to the 40 credits in "Biomedical" offered as part of the bachelor program in engineering.

### Compulsory Courses

GBIO0029-1	<i>Bioelectronics</i> (english language) - Michael KRAFT - [20h Labo., 20h Proj.]	Q1	30	15	[+]	5
GBIO0012-2	<i>Biomechanics</i> (english language) - Davide RUFFONI - [1d FW]	Q1	30	30	[+]	5
GBIO0008-2	<i>Medical imaging</i> (english language) - Christophe PHILLIPS - [8h Labo., 1d FW]	Q2	33	12	[+]	5
GBIO0027-1	<i>Integrated project in biomedical engineering</i> (english language) - Liesbet GERIS, Davide RUFFONI	TA	30	90	-	10
	<b>Corequisite :</b> GBIO0001-1 - Biophysique et biochimie GBIO0025-1 - Biologie générale et cellulaire GBIO0026-1 - Physiologie des systèmes					
GEST3162-1	<i>Principles of management</i> (english language) - Michael GHILISSEN, François PICHAULT, Thierry PIRONET, Didier VAN CAILLIE - Suppl : Fanny FOX	Q1	25	25	-	5

### Optional courses

Choose one of the following options :

#### Imaging and instrumentation

Choose 30 credits in the following list :

[...] [b]The subjects GBIO0001-1, GBIO0025-1 et GBIO0026-1 are corequisite to some compulsory courses of the master program. They must be taken as a priority, unless they were already taken as part of the bachelor in engineering, or unless the corresponding knowledge and skills have been acquired previously.[/b]

MATH0461-2	<i>Introduction to numerical optimization</i> (english language) - Quentin LOUVEAUX - [25h Proj.]	Q1	30	20	[+]	5
ELEN0016-2	<i>Computer vision</i> (english language) - Marc VAN DROOGENBROECK - [50h Proj.]	Q1	30	10	[+]	5
PHYS0128-1	<i>Magnetic Resonance Imaging - the Basics</i> (english language) - Evelyne BALTEAU - [3d FW]	Q1	15	-	[+]	3
ELEC0017-1	<i>Electromagnetic Compatibility</i> (english language) - Véronique BEAUVOIS, Christophe GEUZAINÉ - [30h Proj.]	TA	20	10	[+]	5
ELEN0071-1	<i>Digital Signal Processing</i> (english language) - Jacques VERLY - [40h Proj.]	Q2	45	15	[+]	5
ELEN0062-1	<i>Introduction to machine learning</i> (english language) - Pierre GEURTS, Louis WEHENKEL - [40h Proj.]	Q1	30	5	[+]	5
STAT0722-1	<i>Introduction to medical statistics</i> - Christophe PHILLIPS	Q1	10	5	-	2
INFO0939-1	<i>High performance scientific computing</i> (english language) - Christophe GEUZAINÉ - [20h Proj.]	Q1	30	15	[+]	5
INFO0009-1	<i>Database (general organisation)</i> - Pierre WOLPER - [25h Proj.]	Q2	30	25	[+]	5
SYST0003-1	<i>Linear control systems</i> (english language) - Guillaume DRION - [6h	Q1	30	30	[+]	5

	Labo.]								
ELEN0060-2	<i>Information and coding theory</i> (english language) - Louis WEHENKEL - [30h Proj.]	Q2	30	15	[+]	5			
ELEN0070-2	<i>Signal processing</i> (english language) - Jacques VERLY - [40h Proj.]	Q2	45	15	[+]	5			
ELEN0074-1	<i>Sensors, microsensors and instrumentation</i> (english language) - Philippe VANDERBEMDEN - [20h Labo.]	Q2	30	-	[+]	5			
ELEN0037-1	<i>Microelectronics and IC design</i> (english language) - Michael KRAFT - [40h Proj.]	Q2	30	20	[+]	5			
INFO0064-2	<i>Embedded systems</i> (english language) - Bernard BOIGELOT	Q1	25	20	-	5			

#### Mechanics, Materials and Chemistry

Choose 30 credits in the following list :

[...] [b]The subjects GBIO0001-1, GBIO0025-1 et GBIO0026-1 are corequisite to some compulsory courses of the master program. They must be taken as a priority, unless they were already taken as part of the bachelor in engineering, or unless the corresponding knowledge and skills have been acquired previously.[/b]

MECA0036-2	<i>Finite Element Method</i> (english language) - JeanPhilippe PONTHOT - [40h Proj.]	Q2	30	30	[+]	5			
MECA0464-1	<i>Large deformation of solids</i> (english language) - JeanPhilippe PONTHOT - [60h Proj.]	Q1	30	30	[+]	5			
MECA0031-2	<i>Kinematics and dynamics of mechanisms</i> (english language) - Olivier BRULS - [40h Proj.]	Q2	30	20	[+]	5			
MECA0446-2	<i>Continuum Mechanics</i> (english language) - JeanPhilippe PONTHOT - [50h Proj.]	Q2	30	30	[+]	5			
MECA0025-3	<i>Fluid Mechanics</i> - Eric DELHEZ - [30h Proj.]	Q2	30	30	[+]	5			
MECA0008-1	<i>Microfluidics</i> (english language) - Tristan GILET - [16h Labo., 14h Proj.]	Q1	22	8	[+]	5			
MECA0018-2	(pas organisé en 2016-2017) <i>Manufacturing processes</i> (english language)	Q2	30	30	-	5			
MECA0474-1	<i>Mechanical computer-Aided-Design</i> (english language) - Eric BÉCHET - [30h Proj.]	Q1	30	30	[+]	5			
CHIM0605-2	<i>Chemistry and inorganic materials</i> - Bénédicte VERTRUYEN - [3d Labo.]	Q2	30	15	[+]	5			
CHIM0604-2	<i>Chemistry and organic materials</i> - Lionel DELAUDE - [5d Labo.]	Q2	30	15	[+]	5			
CHIM0675-1	<i>Macromolecular Chemistry</i> - AnneSophie DUWEZ - [20h Labo.]	Q1	20	-	[+]	3			
	<b>Corequisite :</b> CHIM0604-2 - Chimie et matériaux organiques								
CHIM0698-1	<i>Physical Chemistry of Interfaces</i> (english language) - Cédric GOMMES	Q2	20	10	-	3			
CHIM0666-2	<i>Inorganic materials : manufacturing procedures and propriety</i> - Stéphanie LAMBERT - [30h Labo., 1d FW]	Q2	30	-	[+]	5			
	<b>Corequisite :</b> CHIM0605-2 - Chimie et matériaux inorganiques								
CHIM0676-1	<i>Polymerisation processes</i> (english language) - Klaus KECKANTOINE	Q2	20	-	-	2			
CHIM9277-1	<i>Chemical Reactor Engineering II</i> - Dominique TOYE - [15h Labo.]	Q1	30	4	[+]	4			
CHIM0697-1	<i>Heterogeneous catalysis</i> (english language) - Nathalie JOB - [10h Proj.]	Q2	20	20	[+]	4			
MECA0012-6	<i>Solid mechanics</i> - Laurent DUCHENE - [15h Proj.]	Q2	30	30	[+]	5			
MECA0023-1	<i>Advanced solid mechanics</i> (english language) - JeanPhilippe PONTHOT - [30h Proj.]	Q1	30	30	[+]	5			

### Modeling and informatics

Choose 30 credits in the following list :

[...] [b]The subjects GBIO0001-1, GBIO0025-1 et GBIO0026-1 are corequisite to some compulsory courses of the master program. They must be taken as a priority, unless they were already taken as part of the bachelor in engineering, or unless the corresponding knowledge and skills have been acquired previously.[/b]

SYST0003-1	<i>Linear control systems</i> (english language) - Guillaume DRION - [6h Labo.]	Q1	30	30	[+]	5
MATH0024-1	<i>Modelling with partial differential equations</i> (english language) - Maarten ARNST, Romain BOMAN - [25h Proj.]	Q1	30	20	[+]	5
INFO0939-1	<i>High performance scientific computing</i> (english language) - Christophe GEUZAIN - [20h Proj.]	Q1	30	15	[+]	5
MECA0036-2	<i>Finite Element Method</i> (english language) - JeanPhilippe PONTHOT - [40h Proj.]	Q2	30	30	[+]	5
MATH0461-2	<i>Introduction to numerical optimization</i> (english language) - Quentin LOUVEAUX - [25h Proj.]	Q1	30	20	[+]	5
MATH0471-2	<i>Multiphysics integrated computational project</i> (english language) - Romain BOMAN, Christophe GEUZAIN - [30h Proj.]	TA	20	-	[+]	5
MECA0010-1	<i>Reliability and stochastic modeling of engineering systems</i> (english language) - Maarten ARNST - [28h Proj.]	Q2	16	16	[+]	5
INFO0009-1	<i>Database (general organisation)</i> - Pierre WOLPER - [25h Proj.]	Q2	30	25	[+]	5
MATH0462-1	<i>Discrete optimization</i> (english language) - Quentin LOUVEAUX - [25h Proj.]	Q1	30	20	[+]	5
ELEN0060-2	<i>Information and coding theory</i> (english language) - Louis WEHENKEL - [30h Proj.]	Q2	30	15	[+]	5
ELEN0062-1	<i>Introduction to machine learning</i> (english language) - Pierre GEURTS, Louis WEHENKEL - [40h Proj.]	Q1	30	5	[+]	5
INFO0064-2	<i>Embedded systems</i> (english language) - Bernard BOIGELOT	Q1	25	20	-	3

### Block 2

Depending on your track record or your professional/research focus, some prerequisites/corequisites of your first year program might appear in bloc 2. You are therefore invited to go through the list of courses suggested in bloc 2 even if you enroll for the first time in this master program.

### Compulsory Courses

GEST0188-1	<i>Determination and Recognition of Quality and Conformity</i> - JeanMichel COMPÈRE, Pierre DEWALLEF <b>Corequisite :</b> MECA0521-1 - Gestion QSHE	Q1	30	-	-	3
MECA0521-1	<i>HSE management, Part 2 : Practical aspects of HSE management</i> - Pierre DEWALLEF - [10h Proj., 1d FW] <b>Corequisite :</b> MECA0051-2 - Gestion QSHE	TA	20	10	[+]	2
ATFE0016-1	<i>Master thesis (including introduction to research methodology)</i> - Davide RUFFONI - [750h Proj.]	TA	-	-	[+]	25

### Optional courses

#### Single focus

#### Professional focus

Choose 30 credits from the following list. The thematic structuring is indicative only.

**Compulsory internship (choose between the 3 ECTS and 8 ECTS version)**

ASTG0024-1	<i>Immersion internship</i> - Liesbet GERIS	TA	-	-	-	<b>8</b>
ASTG9007-1	<i>Observation placement</i> - Liesbet GERIS	TA	-	-	-	<b>3</b>
PROJ0011-1	<i>Personal student project (english language)</i> - Bernard BOIGELOT, COLLÉGIALITÉ - [150h Proj.]	TA	-	-	[+]	<b>5</b>

**Imaging and instrumentation**

MATH0049-1	<i>Morphological Characterization of Unordered Systems</i> - Silvia BLACHER	Q1	30	30	-	<b>5</b>
ELEN0071-1	<i>Digital Signal Processing (english language)</i> - Jacques VERLY - [40h Proj.]	Q2	45	15	[+]	<b>5</b>
ELEN0072-1	<i>Statistical signal processing (english language)</i> - Jacques VERLY - [40h Proj.]	Q1	45	15	[+]	<b>5</b>
ELEN0038-1	<i>Microsystems (english language)</i> - Michael KRAFT - [20h Labo., 40h Proj.]	Q2	30	5	[+]	<b>5</b>
ELEN0004-1	<i>Semiconductor devices (english language)</i> - Benoît VANDERHEYDEN	Q1	30	30	-	<b>5</b>
ELEC0017-1	<i>Electromagnetic Compatibility (english language)</i> - Véronique BEAUVOIS, Christophe GEUZAINÉ - [30h Proj.]	TA	20	10	[+]	<b>5</b>
ELEC0041-1	<i>Modelling and design of electromagnetic systems (english language)</i> - Patrick DULAR, Christophe GEUZAINÉ	Q2	30	30	-	<b>5</b>
ELEC0054-1	<i>Application of electrical measurement systems (english language)</i> - Philippe VANDERBEMDEN - [20h Labo.]	Q1	30	10	[+]	<b>5</b>
ELEN0019-2	<i>Audio signal processing : principles and experiments (english language)</i> - JeanJacques EMBRECHTS - [24h Labo., 30h Proj.]	Q1	5	-	[+]	<b>5</b>

**Modeling and Bioinformatics**

SYST0017-1	<i>Advanced topics in systems and control (english language)</i> - Guillaume DRION	Q1	30	30	-	<b>5</b>
GBIO0017-1	<i>Parametric identification of biological models</i> - Dominique TOYE	Q1	10	10	-	<b>2</b>
GBIO0014-2	<i>Modeling of physiological systems and clinical applications</i> - Thomas DESAIVE	Q1	30	30	-	<b>4</b>
GBIO0015-1	<i>A tour in genetic epidemiology (english language)</i> - Kristel VAN STEEN - [60h Proj.]	Q2	15	15	[+]	<b>3</b>
BIOC0718-2	<i>Structure-function of biomolecules</i> - Mireille DUMOULIN	Q2	15	25	-	<b>4</b>
GBIO0007-1	<i>Gene sequencing and protein analysis : part a</i> - Bernard JORIS	Q1	10	10	-	<b>2</b>
GBIO0030-1	<i>Computational approaches to statistical generics (english language)</i> - Kristel VAN STEEN - [35h Proj.]	Q2	25	15	[+]	<b>5</b>
GBIO0031-1	<i>Learning from genomic data (english language)</i> - Kristel VAN STEEN - [150h Proj.]	Q2	-	-	[+]	<b>5</b>

**Mechanics, materials and chemistry**

PROT0430-3	<i>Biomedical robotics and active prostheses</i> - Olivier BRULS	Q1	15	10	-	<b>3</b>
MECA0058-1	<i>Fracture mechanics, damage and fatigue (english language)</i> - Ludovic NOELS - [75h Proj.]	Q1	30	10	[+]	<b>5</b>
MECA0516-1	<i>Mechanical properties of biological and bioinspired materials (english language)</i> - Davide RUFFONI - [3h Labo.]	Q1	15	12	[+]	<b>3</b>
CHIM0072-1	<i>Nanomaterials and divided materials engineering</i> - Benoît HEINRICHS, Stéphanie LAMBERT - [15h Labo.]	Q1	20	-	[+]	<b>3</b>
CHIM0625-1	<i>Molecular mechanics and molecular dynamics</i> - Eric SAUVAGE	Q1	10	10	-	<b>2</b>

PHYS0038-2	<i>Introduction into polymer physics including plasturgy</i> - Klaus KECKANTOINE	Q1	30	-	-	<b>4</b>
BIOL0114-3	<i>Electronic microscopies</i> - Philippe COMPÈRE	Q2	45	15	-	<b>5</b>
CHIM0668-1	<i>Agitation and Mixture</i> - Dominique TOYE - [5h Labo.]	Q1	20	5	[+]	<b>3</b>
BIOC9241-1	<i>Microbial technologies</i> - N...		15	5	-	<b>2</b>
MECA0473-1	<i>Metallic materials Engineering</i>	Q1	30	30	-	<b>5</b>
PHYS0069-1	<i>Introduction to statistical physics</i> - Nicolas VANDEWALLE	Q2	30	30	-	<b>5</b>
<b>Biomedical engineering and modeling</b>						
GBIO0018-2	<i>Introduction to tissue engineering (english language)</i> - Liesbet GERIS - [15h Proj.]	Q2	20	5	[+]	<b>3</b>
BIOC0430-1	<i>Interaction of living material</i> - Christian GRANDFILS	Q1	25	-	-	<b>3</b>
GBIO0022-1	<i>Biomimetism (english language)</i> - Philippe COMPÈRE, Liesbet GERIS, Tristan GILET, Eric PARMENTIER, Davide RUFFONI - [45h Proj.]	TA	15	-	[+]	<b>5</b>
INGE0012-1	<i>Scientific research in engineering and its impact on innovation (english language)</i> - Rodolphe SEPULCHRE	Q2	30	30	-	<b>5</b>

#### Research focus

Aimed at students who have taken this focus in 2015-2016.

#### Bloc d'aménagement du programme de l'année

### Additional ECTS Master in biomedical engineering

#### Optional courses

Each student's programme will be determined by the jury depending on their prior training. If an applicant does not meet certain prerequisites, his or her programme may include up to 60 additional course credits essentially taken from the list below :

GBIO0025-1	<i>General and cell biology</i> - Olivier PEULEN	Q2	30	30	-	<b>5</b>
GBIO0026-1	<i>Systems physiology</i> - Philippe KOLH	Q2	30	30	-	<b>5</b>
GBIO0002-1	<i>Genetics and bioinformatics (english language)</i> - Franck DEQUIEDT, Kristel VAN STEEN - [15h Proj.]	Q1	30	15	[+]	<b>5</b>
GBIO0011-1	<i>Biological Systems Modelling</i> - Pierre DAUBY, Liesbet GERIS	Q2	30	30	-	<b>5</b>
GBIO0001-1	<i>Biophysics and Biochemistry</i> - Paulette CHARLIER, Liesbet GERIS - [6h Proj.]	Q1	30	24	[+]	<b>5</b>
GBIO0021-1	<i>Laboratory Project</i> - Thomas DESAIVE, Liesbet GERIS - [16h Labo., 8h Proj.]	Q2	-	44	[+]	<b>5</b>
GBIO0013-1	<i>Phenomenon of Transport in Biology</i> - Dominique TOYE	Q2	30	30	-	<b>5</b>
GBIO0005-1	<i>Introduction to cognitive neurosciences</i> - Pierre LEPRINCE, Gilles VANDEWALLE	Q2	30	30	-	<b>5</b>

[...] To this list may be added, up to a limit of 60 credits, other technical classes depending on the skills the student has acquired.

#### Basics in bioengineering

GBIO0001-1	<i>Biophysics and Biochemistry</i> - Paulette CHARLIER, Liesbet GERIS - [6h Proj.]	Q1	30	24	[+]	<b>5</b>
GBIO0025-1	<i>General and cell biology</i> - Olivier PEULEN	Q2	30	30	-	<b>5</b>
GBIO0026-1	<i>Systems physiology</i> - Philippe KOLH	Q2	30	30	-	<b>5</b>